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Review of Retracted Mine Plan

Drayton South Coal Project

Hunter Thoroughbred Breeders Association

22 MAY 2014

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History

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7-May-2014	0	Final Issue for Review
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Endorsements

Function	Signature	Name and Title	Date
Prepared By		Carl Fung Lead Consultant - Environmental Engineering	22-MAY-2014

EXECUTIVE SUMMARY

Advitech Pty Limited (Advitech) was engaged by the Hunter Thoroughbred Breeders Association (HTBA) to critically review the air quality impact assessment (AQIA) associated with the submission lodged by Hansen Bailey on behalf of Anglo American Metallurgical Coal in March, 2014 for the Retracted Drayton South Coal Project.

A detailed section by section critique of the Retracted Drayton South Coal Project is provided in **Table 1** and the issues identified in the critique can be summarised into five theme areas:

1. The retracted mine plan is not consistent with the Planning and Assessment Commission (PAC) December 2013 recommendation.

2. Critical review of the retracted mine plan is hampered by a lack of quantitative data which would allow verification of air quality claims. For example:
   - Supportive air dispersion modelling contour plots showing revised dust concentration contours have not been presented to allow comparison between previous assessments and the proposed retracted mine plan.
   - Hansen Bailey cites a sensitivity analysis undertaken by SKM that incorporates revised soil silt and moisture contents. The sensitivity analysis is not attached in the retracted mine report and justification of the use of average values as opposed to worse case data.

3. The Hanson Bailey report, is based on the premise that since the mine is 'retracted', or 'limited' in size spatially, air impacts will be less than previously modelled. This is not necessarily the case.
   - The additional impacts of the proposed operation of a dragline which was previously not an inclusion in the Redbank mining area, have not been quantified. The proposed dragline may result in dust emissions released at an elevated height and therefore raise the potential for a greater spatial dispersion of dust off-site.

4. Mine separation distances presented in Figure 2 of the retracted mine plan do not appear to be a representative of the closest linear distance from Woodlands stud to the proposed nearest mining area.

5. The retracted mine plan states there will still be off-site exceedences in predicted PM_{10} 24 hour dust.

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1. INTRODUCTION

Advitech Pty Limited (Advitech) was engaged by the Hunter Thoroughbred Breeders Association (HTBA) to critically review air quality impact assessment (AQIA) issues associated with the submission lodged by Hansen Bailey on behalf of Anglo American Metallurgical Coal in March, 2014 for the Retracted Drayton South Coal Project.

It should be noted that this report was prepared by Advitech for the HTBA ("the customer") in accordance with the scope of work and specific requirements agreed between Advitech and the customer. This report was prepared with background information, terms of reference and assumptions agreed with the customer. The report is not intended for use by any other individual or organisation and as such, Advitech will not accept liability for use of the information contained in this report, other than that which was intended at the time of writing.

2. REFERENCES

The analysis has been conducted on the basis of the following references:

- Hansen Bailey report, March 2014. Drayton South Coal Project Consequential Environmental Impact Assessment for the Retracted Mine Plan.
- Advitech report (13007501 Rev0), October 2013. Review of Proponent Response Drayton South Coal Project.
- Advitech presentation at Planning Assessment Commission Hearing Denman 10 October 2013 (13007-Presentation-R1), October 2013. *Air Quality Assessment Review – Drayton South.*
- Hansen Bailey, 2013. Drayton South Coal Project Response to Submissions.
- PAEHolmes, 2012. Drayton South Air Quality and Greenhouse Gas Impact Assessment, 3617B.

3. AQIA CRITICAL REVIEW

Table 1 lists Advitech's critical review and commentary based upon the 2014 Hansen Bailey Retracted Mine Plan report.

Appendix I, **Table 2** lists a chronological history of Advitech's critical review and commentary based upon the 2014 Hansen Bailey Retracted Mine Plan report, the 2012 PAEHolmes Air Quality and Greenhouse Gas Impact Assessment and Hansen Bailey Response to Submission May 2013. The 2012 Air Quality and Greenhouse Gas Impact Assessment was undertaken by PAEHolmes on behalf of Hansen Bailey.

Table 1: Critical Review of Hansen Bailey Consequential Environmental Impact Assessment for Retracted Mine Plan March 2014

Hansen Bailey 2014 Report Reference	Subsection	Issue of Concern	Advitech Comment
Section 1	-	Largely a qualitative assessment.	The proponent has presented a qualitative assessment of the predicted environmental impacts only. Limited new modelling data is provided but only in summarised form (Appendix B, Table 1). Overall conclusions concerning the retracted mine project impact on air quality are generally based upon the premise that since the mine is 'retracted', or 'limited' in size (a combination of tonnage ROM and disturbed land area) spatially, air impacts (TSP and PM_{10}) will be less than previously modelled.
Section 2.2.1	-	Retracted mine plan is not consistent with the NSW PAC December 2013 recommendations. Dragline operation.	The retracted mine plan proposes the complete removal of the Houston mining area (originally proposed for year 15 onwards), a significant portion of the Whynot mining area, and a 'substantial' area in the southernmost part of the Redbank mining area. There is no change to the Blakefield mining area. The retracted mine plan is not consistent with the NSW PAC December 2013 recommendations (refer to Figure 3, Section 2.3.4). Hansen Bailey further comment that all other project elements are assumed to remain as per the Project Description in the EA but fail to quantify potential air impacts associated with the proposed operation of a dragline which was previously not an inclusion in the Redbank mining area. The report states; "the retracted mine plan has an increased reliance on dragline overburden movement" (refer to Section 2.3.2 of the Hansen Bailey report).
Section 2.2.2	Figure 2	Mine separation distance.	The calculated mine separation distance between Darley Woodlands stud and the Drayton South mine is unusual. Figure 2 indicates that proximity measurements have been taken from the western edge of the Redbank mining area. A review of Figure 2 would present the Blakefield mining area to be of closer proximity to Darley Woodlands.
Section 2.3.2	-	Operation of a dragline.	The addition of a dragline in the Redbank mining area has the potential to change dust emission estimates. No supportive air modelling and predictions of dust impact that include the dragline is presented. Hansen Bailey simply document that the dragline is operated in accordance with leading practice requirements. It is recommended that supportive air modelling be presented given that dragline emissions and source characteristics (e.g. release height) may differ significantly from the originally proposed excavator/haul truck arrangement.
Section 3.0	-	Retracted mine plan emissions inventory. No supportive modelling.	Hansen Bailey state that: "Given the fact that the retracted mine plan represents a reduction in footprint only and there are no new project elements, all remaining environmental and socio-economic aspects are deemed consistent with the impact assessments and associated mitigation and management measures provided in the EA and PPR." This statement is not easily verifiable and may lead to an incorrect basis for conclusions associated with the retracted mine project. Figure 2, Appendix B presents data describing the retracted mine project run of mine (ROM) tonnages and suggests ROM tonnage reductions of between 5-20 % across years 3, 5, 10 and 15. Hansen Bailey acknowledges that predicted air quality will be worst during mine operational years 10 and 15. For years 10 and 15 the estimated reduction in ROM tonnages is 15% and 2%, respectively. A 2% reduction in ROM for year 15 is not considered significant: From this it can be deduced that air emissions during year 15 will be very similar to previous assessments (refer to 2012 EA and 2013 Hansen Bailey reports). From an air quality perspective, it is the intensity of mine related activities that will be a more dominant factor. A reduced Redbank mining area (refer to Figure 3, Section 2.3.4) may in some part reduce any predicted dust concentrations greater than 50 $\mu g/m^3$ at sensitive receptor sites (refer to Hansen Bailey, 2013. Drayton South Coal Project Response to Submissions Appendix C, Figure 3-1 and Figure 3-2). Supportive air dispersion modelling contour plots showing revised dust concentration contours have not been presented to allow comparison between previous assessments and the proposed retracted mine plan. It is generally acceptable that most (if not all) dust emissions are released from close to ground level, and that retracting mine activities would reduce environmental impact to sensitive receptors. However the proposed dragline to be now used in the Redbank mining area (Section 2.2.1) may result in dust emissions released at an elevated height and therefore raise the potential for a greater spatial dispersion of dust off-site.

Hansen Bailey 2014 Report Reference	Subsection	Issue of Concern	Advitech Comment
Section 3.2	-	Off-site PM_{10} dust exceedences remain.	Hansen Bailey stated there will be "no predicted exceedances of the annual average criteria for TSP, PM_{10} or dust deposition. It also established that with the predictive and proactive mitigation and management measures proposed that 24-hour average PM_{10} is able to be effectively managed in order to prevent any exceedances." What Hansen Bailey does not mention that 24hr PM_{10} exceedences do still occur under the retracted mine plan in Section 3.2 of the report. PM_{10} dust exceedences will still occur but note that the Pacific Environment Limited (PEL) report attached as Appendix B does make note of the potential for PM_{10} 24hr exceedence.
Section 3.2	-	Insufficient information, more complete narrative required.	Hansen Bailey cites a sensitivity analysis undertaken by SKM and revised modelling that incorporates revised soil silt and moisture contents. The applied average value was used in the revised modelling with a 4.9% increase in TSP emissions. The sensitivity analysis is not attached in the retracted mine report. Soil moisture and silt measurement ranges are not provided. It is not clear as to why the average values were applied, as opposed to worst-case data. It is unclear if PM_{10} emissions will also increase with adjusted values of soil moisture and silt content. It is recommended more quantitative analysis be undertaken to support such statements. It is difficult for a more thorough assessment to be conducted with limited available information. A greater transparency of information is required.
Section 3.2	Table 4	Lack of quantified/specific air quality management procedures.	Table 4 list a number of generic management and measurement statements without specific detail to ensure effective environmental monitoring and mitigation of potential air quality impacts. It is likely that, if the mine is approved, operating consent conditions will impose the need for more specific detail regarding monitoring and reporting management in the form of environmental protection licence amendment, environmental management plans etc.

Appendix I

Chronological History of Review of Air Quality Assessment

Table 2: Critical Review of PAEHolmes 2012 AQIA & Public Submission Document May 2013

PAEHolmes 2012 Report Reference	Subsection	Advitech Comment (PAEHolmes 2012 AQIA)	Advitech October 2013 Comment (Hansen Bailey Public Submission Response May 2013)	Advitech May 2014 Comment (Hansen Bailey Retracted Mine Plan Report March 2014)
Section 4.1	-	PAEHolmes have supported their AQIA report using various TSP and PM_{10} monitoring stations in the vicinity of the project. These monitoring stations have been used to support background particulate concentrations in the study. According to PAEHolmes, the HVAS are not continuous but records 24hr average PM_{10} and TSP every 6th day. Therefore, it is possible that not all background levels are reported and that certain weather events that exacerbate background concentrations will be missed. It is known that mines in the vicinity of the project site have had continuous dust and weather monitoring for the past 3-5 years. This data could potentially provide more precise measurement of dust than the HVAS units currently operational. These mines include but not limited to Peabody Energy Wambo coal mine and the Ashton coal mine. HVAS precision can be prone to significant variation (up to ±40% inaccuracy) if not properly maintained. There is no demonstration that HVAS units mentioned in this AQIA present reliable outputs. The proponent should demonstrate that HVAS units used to substantiate parts of this report were maintained according the AS3580.9.3, AS3580.9.6 or some other recognised management system.	Largely not addressed. The inadequacy of the HVAS recording system has been accepted by proponent.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.
Section 4.1.1	Table 4-1	The proponent has avoided any statement/observation that indicated dust deposition rate data (D9-D12) is generally increasing with each monitoring year. This observation may link into ever increasing mining intensity for the region.	Proponent has made specific comment. Advitech's statement relates to the period 2005 onwards. Charts for D9 to D12 show an increasing linear trend with time.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.
Section 4.1.1	Figure 4-2	It is observed that the elevated dust level at D9 caused by the NSW dust storm (22-24 September 2009) is not represented at D10, D11 and D12. An explanation of this irregularity is required.	Proponent has not made specific comment.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.
Section 4.1.2 Section 7.5	-	PAEHolmes states that "main sources of particulate matter in the area include nearby mines, coal-fired power stations, with minor emissions from traffic on sealed and unsealed roads, local building, construction and agricultural activities." It is Advitech's opinion that power station cumulative contributions (either current or potential future) are not adequately captured by the existing HVAS monitoring network. As a result, there is some concern that air impacts from power stations (and potentially other sources) are underestimated. If there is an underestimation, then this could lead to fewer dust exceedence events than would otherwise occur for project identified sensitive receptors. Additional commentary relating to the background monitoring is included below: ▪ The PAEHolmes report (Section 7.5, pg51) mentions that power station particulate contributions (i.e. Liddell and Bayswater) are captured by the current monitoring network used in this assessment. The monitoring network being	Proponent has not made specific comment. Largely not addressed.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.

PAEHolmes 2012 Report Reference	Subsection	Advitech Comment (PAEHolmes 2012 AQIA)	Advitech October 2013 Comment (Hansen Bailey Public Submission Response May 2013)	Advitech May 2014 Comment (Hansen Bailey Retracted Mine Plan Report March 2014)
		HV4, HV2a, HV5, Lot 9, Pringles and Lot 22. PAEHolmes later admits that the monitoring network is sparsely located (pg. 53). ▪ On pg51, PAEHolmes concludes that the incremental dust background from the proposed Bayswater B 2000 MW power station is negligible at sensitive receptors. However, review of the Katestone Environmental 2009 report in conjunction with the PAEHolmes 2012 report reveals the following: a) It is unclear which sensitive receptor reported the maximum PM_{10} 24hr increment value of 0.13 µg/m^3. b) It is unclear which fuel option PAEHolmes have chosen in their increment comparison, i.e. gas or coal fired. c) The incremental value quoted by PAEHolmes appears to reflect the maximum PM_{10} 24hr increment for the 'gas fired option' (refer to Figure 64, Kaystone report). A comparison with the 'coal-fired option' indicates much higher predicted GLC. In general, when compared to gas GLC isopleths, coal air impacts are up to 2 times higher (refer to Figure 52, Katestone report). If it was extrapolated, the probable current plus future total air impacts (based on installed power station MW generation capacity) to include Bayswater B (2,000 MW), Bayswater (2,000 MW) and Liddell (2,640 MW), then presumably an estimate of probable current plus future levels to be approximately 7 times higher than the value of 0.13 µg/m^3 published by PAEHolmes. This would result in a more marked contribution from power stations and could conceivably be in the order of 1 µg/m^3, not 0.13 µg/m^3 as quoted by PAEHolmes. It should be noted that the Bayswater B proposed power station was modelled at a preferred stack height of 300 m. Existing Bayswater and Liddell power station stacks are much lower at 248 m and 168 m respectively. It is conceivable that with a lower stack height, dispersion characteristics for existing power stations will be less favourable than Bayswater B, and hence an expectation that particulate GLC's will be higher than extrapolated previously. ▪ There is a presumption that the existing monitoring network captures all power station particulate emissions. However, reviewing a representation of both annual and 24hr PM_{10} from the Katestone report suggests Bayswater B air impacts to be non-uniform within the modelling domain. Therefore, it is quite feasible that HVAS monitoring units will not pick up representative 'background' from power stations. This is also complicated by the one in every sixth day operation of the HVAS units.		
Section 4.2	-	The proponent has concluded that the year 2005 is the most representative year for air dispersion modelling. Their conclusion is based upon % wind calms and wind roses for two weather stations (Saddlers Creek and Macleans Hill). It appears that no other meteorological or climatic measure (e.g. rainfall, long term min and max temperatures etc.) has been used to justify their chosen year. Furthermore, there appears to be no evidence that PAEHolmes has interrogated the Jerry's Plains BOM weather station to compare wind roses or other meteorological statistics. Real time air monitoring systems for both meteorology and dust (TSP and PM_{10}) are now established within the vicinity of the project. Advitech can verify that real time monitoring systems have been operating for the past 3-5 years. As such, it is possible for	Proponent has made specific comment. The basis appears to largely remain with wind calms being the parameter to select representative meteorological dataset. Why not other parameters such as wind direction, rain etc.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.

PAEHolmes 2012 Report Reference	Subsection	Advitech Comment (PAEHolmes 2012 AQIA)	Advitech October 2013 Comment (Hansen Bailey Public Submission Response May 2013)	Advitech May 2014 Comment (Hansen Bailey Retracted Mine Plan Report March 2014)
		PAEHolmes to select a more recent year for dispersion modelling purposes, and in addition put themselves in a much better position to apply NSW OEH level 2 contemporaneous dust evaluations without the need for advanced statistical methods to substantiate cumulative dust impacts (refer to section 8.3.2 pg67).		
Section 4.2.1	Appendix A	The proponent has referred the reader to Appendix A. Appendix A does not include wind rose information for Macleans Hill or, for that matter, the Drayton weather station (refer to Section 5.3). It would be of value to the reader to understand the wind rose characteristics of these other inner grid domain surface observational locations. Justification/explanation is required of whether they are representative and appropriate for this specific assessment, as well as give good comparison between each other. PAEHolmes has indicated that the Saddlers creek data is >90% complete. Similar quantification of missing data is required for all weather stations used in this assessment. A more complete meteorological observational dataset will improve the representativeness of the final CALMET wind field.	Proponent has not made specific comment.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.
Section 4.2.2	Table 4-5	There appears to be no year-by-year comparison of climatic statistics that may substantiate why 2005 was the best year to model the project. It should be noted that another major air impact assessment in the Hunter Valley (PWCS T4, February 2012) presented a more rigorous justification of modelled year and elected the year 2010 after comparisons of the annual wind roses and statistical evaluation of the wind speed records for several weather stations between 2006-2011. There appears little evidence of a similar approach for the proponent of the Drayton South project.	Proponent has made limited specific comment but once again considers wind calms as a proxy for meteorological representativeness.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.
Section 5.1	Appendix F	PAEHolmes states that a TAPM generated 3D data file in 3 km grid was used to generate the final inner domain wind field. This level of model resolution may not detect the adjacent valleys that surround the project site and, not surprisingly, would yield data that may not be representative of the location. The proponent should justify that a 3 km grid is sufficient to support the final CALMET meteorology wind field. However, to simulate local meteorology on the scale needed for surrounding areas, based on TAPM generated data, it is suggested that PAEHolmes re-run TAPM with a four nest configuration, which would simulate 3D meteorological data with 1 km grid resolution.	Proponent has not made specific comment. Not addressed.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.
Appendix F	Table E2	Values of TERRAD, R1MAX, R2MAX, R1, R2. The value of TERRAD appears too large. The value of TERRAD is determined based on an analysis of the characteristic length scale of the surrounding terrain. If it is too large, then the hill several valleys away is seen, instead of the one nearby. A simple rule of thumb is 'ridge-to-ridge divide by 2, rounded up'. Analysis of Figure 5-5 suggests a ridge to ridge line distance of approximately 8 km, therefore a TERRAD value of 4 km. PAEHolmes should justify why a TERRAD value of 10 km was applied for the inner domain. The values of R1MAX (0.3 km), R2MAX (0.3 km), R1 (0.1 km) and R2	Proponent has not made specific comment. Not addressed.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.

PAEHolmes 2012 Report Reference	Subsection	Advitech Comment (PAEHolmes 2012 AQIA)	Advitech October 2013 Comment (Hansen Bailey Public Submission Response May 2013)	Advitech May 2014 Comment (Hansen Bailey Retracted Mine Plan Report March 2014)
		(0.1 km) appear very small - especially when considered in relation to the inner domain topography. Typically for observation sites in flat terrain, values of R1 and R2 would be larger than in mountainous terrain where a station's flow is limited by the valley segment. However such small values suggest that PAEHolmes does not want to give much weighting to surface meteorological observations. PAEHolmes should justify why such small values were chosen.		
Section 5.2	-	PAEHolmes has stated that default TAPM terrain values (resolution approximately 1 km) dataset provided, and default land use and soils data sets for TAPM, were used for the outer domain. The accuracy of land use categories and resolution of terrain are important for adjusting initial TAPM mesoscale meteorological data winds to include terrain and land use effects for plume dispersion. Reporting of which year land-use dataset has been based is required, as well as justification/explanation of whether this is representative and appropriate for this specific assessment.	Proponent has not made specific comment. Not addressed.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.
Section 5.3		PAEHolmes states that 90 m DEM data sourced from NASA was applied for the inner domain. Terrain data should be of sufficient scale to represent the local terrain and PAEHolmes should justify that 90 m DEM data is sufficient for the purpose of the study. Justification/explanation is required of whether 90 m DEM data resolves smaller valleys that might be important for this specific assessment. This is particularly important for sensitive receptors located close to the boundary of the proposed project. Higher resolution 30 m DEM terrain data is easily available and should be used where warranted.	Proponent has not made specific comment. Not addressed.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.
Section 6	Table 6-2	PAEHolmes has assumed particular control factors for dust control. For example, surface stabilisation - watering is assumed to reduce dust emissions by 50%. PAEHolmes has not justified how this control will be achieved, or confirmed what this watering rate is required to achieve this control.	Proponent has made specific comment. ▪ The proponent has attempted to improve the mine developments impact by improving a variety site dust control measures (e.g. aerial seeding) as well as adjusting for silt and soil moisture content. They have indicated quite significant reduction in silt % (generally over a range of emission sources) and increase in soil moisture % (generally in the same categories). This new data has reduced emission inventories by around 28%. However, it is apparent that these samples were collected by the mine and not by independent specialists. There is insufficient information about the methodology applied and whether it is representative for such an important soil parameter. They claim this improves air quality for mine years 10 and 15. A review of Appendix C cannot determine if the sampling method follows an approved method such as AP-42 Appendix C.1. This may influence the ultimate emission inventory input. It is not clear how these tighter control factors will be achieved or enforced. ▪ It is difficult to determine the accuracy of 70% emission reduction from aerial seeding (stated in submission of 70%) as the success of aerial seeding will be dependent upon whether it is used in isolation, or in conjunction with hydromulch, topsoil stripping and longer term maintenance etc. The EET Manual for Mining (Version	Hansen Bailey has applied revised soil moisture and silt content values based upon recommendations from the SKM Peer Review which was completed for the NSW DP&I. The sensitivity analysis compared site specific data collected from numerous coal mines across NSW (with regard to soil silt and moisture contents) and assessed what would be the likely change in total site emissions if the average silt and moisture contents from these other sites were used. There is no disclosure to the reader of the soil moisture and silt measurement range of the SKM peer review data. Why was the average value applied and not the worst-case from the available data? There is no explanation of increase in PM10 emissions associated with updated silt and moisture values - as there would be. As a minimum a more supporting narrative is required to support such statements. Previous concerns associated with assumed aerial seeding control factors remain.

PAEHolmes 2012 Report Reference	Subsection	Advitech Comment (PAEHolmes 2012 AQIA)	Advitech October 2013 Comment (Hansen Bailey Public Submission Response May 2013)	Advitech May 2014 Comment (Hansen Bailey Retracted Mine Plan Report March 2014)
			3.1 January 2012) states emission reductions from wind erosion vary from 30% for primary rehabilitation up to 100% for fully rehabilitated (release) vegetation	
Section 4.2.2, Section 7.0 Section 7.4		There appears to be no discussion or comment by PAEHolmes regarding the issue of regional climate change and how climate change may impact on surface wind speeds, rainfall, air temperature, evaporation, periods of wind calm and other meteorological parameters that have the potential to influence the dispersion of dust from the project site. Assessment and explanation of impacts under these conditions between planned project years 2013-2040 is required. The Climate Change in Australia web site (developed by CSIRO and the Bureau of Meteorology in partnership with the Department of Climate Change and Energy Efficiency) presents probable climate change scenarios for Australia. Advitech suggests PAEHolmes and the proponent consider these forecasting models and provide appropriate response(s) in the AQIA. Advitech's review of the Climate Change in Australia web site suggests that wind speeds in the Hunter Valley may expect increases of up to 30% over the next 20-30 years. If CSIRO projections are correct, and there is evidence that they are accurate-to-date then, proportionally, wind erosion and vehicle dust emissions will rise by a similar value. Consequently there is a concern that the number, magnitude and geographical extent of off-site dust exceedences from the proposed project may rise. It is our understanding that wind erosion and vehicle dust emissions are generally the highest contributor of dust emissions. This is generally reflected in the PAEHolmes emissions inventory tables. For example Table 7-5 pg48 presents wind speed dependent and wind speed independent dust contributions from other mines. Project site specific dust emissions are also mentioned in the report. PAEHolmes noted wind speed dependent and independent dust contributions (Section 7.4, pg47-48). They have made certain justification that 73.2% for all off-site emissions are independent of wind speed. The remainder of emissions are dependent on wind speed and therefore is at risk of increasing over time due to the effects of increased wind speed. PAEHolmes have provided no sensitivity analysis as to the increase in off-site impacts associated with climate change impacts associated with the project. A significant proportion of dust emissions are generated from stockpile wind erosion emissions. These have been estimated using wind independent default factors of 0.4 kg/ha/hr for TSP. These defaults are originally derived from a 1983 SPCC study, which was conducted close to a mine site in the Hunter Valley. The continued application of default (wind independent) values raises concern as most of the NPI air quality equations and guidelines are based on the US EPA's AP-42 (1995). In fact there is a listed equation providing a wind speed parameter for the calculation of erosion from stockpiles (US EPA's AP-42 equation for wind erosion). SKM (2005) undertook a review of the SPCC 1983 study and determined that the default value of 0.4 kg/ha/hr was highly specific to a location and ore type. In addition the value was not based on measurements, but was likely an estimate using US EPA's AP-42	Proponent has made specific qualitative comment but lacks any quantitative examination of how climate change may influence off-site impacts. . ▪ The proponent has accepted that forecast climate change (temperature, moisture, wind speed) may marginally increase the predicted ground level dust concentrations generated by the Project. They have not demonstrated whether air quality will continue to be within acceptable bounds. Largely not addressed.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.

PAEHolmes 2012 Report Reference	Subsection	Advitech Comment (PAEHolmes 2012 AQIA)	Advitech October 2013 Comment (Hansen Bailey Public Submission Response May 2013)	Advitech May 2014 Comment (Hansen Bailey Retracted Mine Plan Report March 2014)
		and typical Hunter Valley values with a silt content of 7% (for coal and overburden, NERDDC, 1986 Table 8), number of rain days (80) and with 13.4% of the wind greater than 5.4 m/s (as taken from the Bureau of Meteorology site at Kurri Kurri). Needless to say, a predicted increase in surface wind speed due to climate change may render the SPCC 1983 reference basis less relevant and potentially contribute to an under prediction in off-site air impacts. The application of wind independent stockpile TSP emissions should be reviewed for continued acceptance by government and modellers. If a similar proportional increase to the default stockpile erosion value is simulated (due to wind speed increases as a result of climate change), it would be our expectation that the number of predicted off-site exceedences will also increase.		
Section 7.5		PAEHolmes have presented a methodology to estimate the contribution of distant mines and other sources. The analysis has examined the meteorological year 2005 and determined 'other contributions' by calculating 'the contribution' as the difference between the predicted 2005 project and surrounding 2005 mine emissions and available 2005 HVAS monitoring records. Advitech believes that PAEHolmes may have determined the 2005 'other contribution' background, but not accounted for increases in 'other contribution' dust emission intensity for the present day. In other words, Advitech believes that 'other contributions' are underestimated. It would be expected that mining intensity between 2005 and 2012 has increased markedly. This in part is described by reported dust deposition rate data (D9-D12) in Table 4-1. A cursory review of Port Waratah Coal Services ship export tonnages since 2005 indicates a 22% increase in terminal coal exports to 97.8 Mtpa (2011). Consequently, Advitech believes that 'other contributions' will be higher than otherwise represented in the PAEHolmes report.	Proponent has not made specific comment.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.
Section 7.5	Table 7-8 and 7-9	Comparison between the assumed PM_{10}/TSP ratio as outlined in Section 7-2 does not compare well with PM_{10}/TSP ratios outlined in Table 7-8 and Table 7-9. The PM_{10}/TSP ratio in these tables varies between 0.34 and 0.67. Generally, the PM_{10}/TSP ratio would be expected to be relatively constant. Further explanation is required of why this occurs within the dataset being used to underpin the assessment, as well as justification for the adopted PM_{10}/TSP ratios.	Proponent has not made specific comment.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.
Section 8.3		Although it appears that the application of the Monte Carlo method to describe cumulative impacts has been applied in previous AQIA (and therefore presumed acceptable by the NSW OEH), the report does not make any reference to specific documented communication from the NSW OEH for its approved application. According to Section 5.1.1 of NSW DEC document, "The use of an approach other than those above (i.e. Accounting for background concentrations Level 2 assessments) should be discussed with the Air Technical Advisory Services Unit of DEC." A continued review of the proposed Monte Carlo method raises another question since the approach is based on probability and necessarily simulates scenarios with lower risk than the official NSW DEC level 2 methodology. Our understanding of the Monte Carlo method for this project highlights potential concern with the applied	Proponent has made specific comment. Issues still outstanding. Advitech has concerns about the following: ▪ Accuracy of basic inputs into the Monte Carlo simulation. This extends to various facets of the AQIA including met data, emission inventory estimates, background data validity, representativeness of background data etc. ▪ 250,000 random selections to generate a probability distribution may not seem sufficient. It is not clear if the value of 250,000 is achieving a particular level of confidence? In order to examine every possibility/	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.

PAEHolmes 2012 Report Reference	Subsection	Advitech Comment (PAEHolmes 2012 AQIA)	Advitech October 2013 Comment (Hansen Bailey Public Submission Response May 2013)	Advitech May 2014 Comment (Hansen Bailey Retracted Mine Plan Report March 2014)
		method. PAEHolmes has approached the exercise by creating only 1 model year and combining this with 1 observed year through 250,000 permutations. This, on face value, appears to be a fairly limited assessment. Justification is required for why monitoring data for a single year was used rather than data for all available observed monitoring years. The detail and the approach of the proposed methodology require, at minimum, more explanation to show how and why this is a suitable assessment and, at worst, this lack of detail implies that an accurate estimation of cumulative impacts is not actually sought. Furthermore, it may have been easier for PAEHolmes to model the proposed project with a more recent modelled year whereby direct application of the EPA Level 2 assessment criteria be applied. As mentioned previously, Advitech is aware that continuous meteorological and dust monitoring networks have been established over the past 3-5 years. Lastly, the proposed Monte Carlo method does not tell the reader what particular days and at what times of the day dust exceedences may likely occur. This output may positively assist in air quality management plan control measures.	combination, the selected number could conceivably be in the order of 850,000 (i.e. 1 in 365 x 1 in 2325). Therefore a reduced number of random selections may impact on the number of day exceedences. ▪ Monte Carlo is examining realistic outcomes not necessarily worse-case outcomes as indicated by NSW OEH Level 2 guidelines. Increasing the number of random selections may improve the gap between Monte Carlo and NSW OEH Level 2 guidelines.	
Section 8.10	Table 8-11	It is assumed that the table value represents the 98%ile, not the 98.6%ile.	Proponent has not made specific comment.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.
Section 8.10		PAEHolmes has assumed the following: "Blocks of land that have the same owner and are contiguous have been considered as a single area". This may not be necessarily be true for neighbouring properties such as Coolmore and Darley. These properties may have multiple land titles that, in aggregate, constitute a supposed total land ownership. PAEHolmes should ensure that their assumption is valid.	Proponent has not made specific comment.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.
Section 9		The introduction appears not to connect with previous sections, especially in relation to off-site dust exceedences.	Proponent has not made specific comment.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.
Section 9.2		There is no mention of the current Hunter Valley dust risk forecasting system already established by ACARP/SKM. There is no suggestion how this project may fit into such a forecasting system or how the forecasting outputs from this system could be used as an air quality management tool for the proposed project. Lastly, there appears to be no discussion as to whether surrounding sensitive receptors already fall within frequent 'high risk' forecast days.	Proponent has not made specific comment.	Hansen Bailey has indicated that Anglo American has implemented a best practice predictive and real-time dust management system at their Drayton site, which includes a daily risk forecast tool for planning and managing day-to-day operations and a real-time dust monitoring system to act and respond to short-term elevated dust.
Appendix A		This section only shows Saddlers Creek wind roses. There is no wind roses information for Macleans Hill and Drayton meteorological stations. This data underpins critical assessment assumptions and should be included.	Proponent has not made specific comment.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.

PAEHolmes 2012 Report Reference	Subsection	Advitech Comment (PAEHolmes 2012 AQIA)	Advitech October 2013 Comment (Hansen Bailey Public Submission Response May 2013)	Advitech May 2014 Comment (Hansen Bailey Retracted Mine Plan Report March 2014)
Appendix D.2		PAEHolmes makes a statement that an increase in $PM_{2.5}$ during winter is likely the result of domestic wood burning and would explain why the annual average is close to or exceeds the NEPM standard. There appears to be a total disregard for power station $PM_{2.5}$ contributions, and it would be expected that during strong atmospheric inversion conditions (that can occur during winter) that these could also be significant contributors to $PM_{2.5}$. Over the 2010-2011 period, both the Liddell and Bayswater power stations emitted an aggregate 229,000 kg $PM_{2.5}$.	Proponent has made specific comment. It is now known from the recently released Fine Particulate Characterisation Study (Upper Hunter) that wood smoke is a dominant contributor (approx. 40%) with coal mining (approx. 20%) and power stations (approx. 20%) constituting the other significant fractions.	Not addressed or no comment made. Refer to historical commentary (columns at left) to understand issue at hand.